UNL News
Vol. 59 No. 8 October, 1979 (ISSN 0149-4163)

Business in Nebraska

Published once in June and July, twice in May, Aug., Oct., Nov., and Dec., and 3 times in Jan., Feb., Mar., April, and Sept. by the University of Nebraska-Lincoln, Dept. of Publications Services & Control, 209 Nebraska Hall, Lincoln, NE 68588. Second-class postage paid Lincoln, Nebraska.

Prepared by the Bureau of Business Research
College of Business Administration

A NEBRASKA STOCK PRICE INDEX

The relationship between the stock market and our nation's economy has been the subject of much research in the past two decades. Early studies indicated that, on the average, stock prices turned downward prior to business cycle peaks and hit a trough prior to a trough in business activity.[1] Douglas Caves and Edgar Feige have recently introduced an Efficient Markets Information Theory (EMIT) model to explain the relationship between the stock market and economic activity.[2] The theory suggests that informed market participants observe a myriad of shocks to the economic system, such as political and economic announcements of oil embargoes or tax reform. In an efficient market such information is assessed and acted upon, being ultimately reflected in market prices. Thus, since prices reflect important economic information, they can be used to improve forecasts of economic activity.

Empirical research has provided support for the EMIT model. The U.S. Department of Commerce index of 500 common stocks has a "long record of serving well as a leading indicator of business recessions and recoveries. Stock price changes both mirror and affect the general state of expectations and they have rarely failed to anticipate any of the major cyclical movements in the economy."[3]

Much of the research done by economists in their search for predictors of future levels of economic activity has been done on a national level. There is, however, a definite need for economic forecasting on the state level as well. It is the purpose of this article to report on the development of an index of stock prices for the state of Nebraska and evaluate its potential usefulness as a leading indicator of the future course of the Nebraska economy.

CONSTRUCTION OF THE NEBRASKA STOCK PRICE INDEX (NSPI)

The usefulness of a good market index depends on the degree to which one may confidently infer movements in prices of the entire population of stocks from movements in the index. For this reason the sample is an important consideration in the construction of an index. A sample should not be an insignificant fraction of the population nor should it be so large that it would be costly to compile. A sample should also contain heterogeneous elements representative of the entire population.

The sample chosen for the NSPI is comprised of the stocks of thirteen companies which are either based in Nebraska or do a substantial portion of their business in the state. The companies are:

Carpenter Paper Company of Nebraska
Commerce Group, Inc.
ConAgra, Inc.
First National Lincoln Corporation
Iowa Beef Processors, Inc.
Kansas Nebraska Natural Gas Company, Inc.
Lincoln Telephone and Telegraph Company
Northern Natural Gas Company
Omaha National Corporation
Pacesetter Building Systems, Inc.
Pamida, Inc.
Union Pacific Railroad
Valmont Industries, Inc.

The sample is relatively small, but it includes several important Nebraska industries, both large and small.

The study of growth patterns in the economy and measurement of business cycles is best accomplished using a market value weighted stock price index. However, it was decided that an equally weighted index would best suit the present study for the Nebraska index. First, the stocks of most Nebraska companies are primarily traded locally, over-the-counter, and market information is not easily obtainable for these companies in brokerage houses across the nation. Second, the market values of the companies comprising the sample are too diverse to weight the price by the number of shares outstanding. For example, on December 31, 1977, Carpenter Paper had over 500,000 shares outstanding at roughly $13 per share. Union Pacific, selling at approximately $50 per share, had over 46 million shares outstanding. The difference in market value was $6.5 million for Carpenter Paper compared to $2.3 billion for Union Pacific. Union Pacific would be weighted 350 times more heavily than Carpenter Paper if outstanding shares were used.

The model chosen for the Nebraska Stock Price Index is patterned after a stock price index developed by Jeffrey Chandler and John Legler for the state of Georgia.[4] Equal weight is given to each stock in the sample, so equal (Continued on page 2)

[1] Beryl Sprinkel, *Money and Markets: A Monetarist View* (Homewood, Illinois: Richard D. Irwin, Inc., 1971).

[2] Douglas W. Caves and Edgar Feige, "Efficient Markets, Stock Returns, the Money Supply and the Economy: Which Tail Wags the Dog?" (University of Wisconsin-Madison, Working Paper).

[3] Victor Zarnowitz and Charlotte Boscham, "Cyclical Indicators: An Evaluation and New Leading Indexes," *Business Conditions Digest*, May, 1975, p. IX.

[4] Jeffrey Chandler and John Legler, "The Georgia Stock Price Index," *Georgia Business*, January/February, 1978, pp. 1-5.

(Continued from page 1) percentage price changes have an identical effect on the index.

All indexes require a base period. For the Nebraska index, 1976 was selected as the base period. This year was arbitrarily assigned a value of 100 for purposes of index construction. During this year the rate of economic growth was near its long-term trend rate. For this reason, 1976 is superior to previous years characterized by severe recession or high levels of prosperity, years which would not serve as an adequate base period.

Closing stock prices for the thirteen companies sampled were collected for the last Friday of each quarter beginning in 1976 and ending with the second quarter of 1979. Small stock dividends of 10 percent or less were ignored, since their effect on price is negligible. Adjustments were made for stock splits to maintain continuity in the index.

THE NEBRASKA STOCK PRICE INDEX COMPARED WITH NATIONAL INDEXES

The calculated values for the Nebraska Stock Price Index are shown in the first column of Table 1. It is interesting to compare the NSPI with several major market indexes to see how closely movements in Nebraska stocks follow the national markets. The relationship is illustrated in Table 1 and Figure 1.

It appears that of the four national indexes—the Over-the-Counter Index, the American Stock Exchange Index, the Dow Jones Composite Index, and the Standard & Poors Composite Index—the NSPI most closely follows the Over-the-Counter and American Stock Exchange indexes. This is not surprising, since the majority of stocks in the NSPI are traded over-the-counter. The NSPI is similar to the American Stock Exchange Index in that both are equally weighted indexes based on price changes. The other indexes are calculated in a different manner.

The downward trends in the Dow Jones Composite are inconsistent with the upward trend of the NSPI. One explanation of this divergence may be that a neglected group of stocks in the "lower market tier" (where most Nebraska stocks are located) have outperformed the favorite blue chips in the "upper tier" which comprise the Dow Jones and Standard & Poors indexes.

THE NEBRASKA STOCK PRICE INDEX AND STATE ECONOMIC PERFORMANCE

In an effort to determine the predictive validity of the Nebraska Stock Price Index for forecasting state economic activity, the stock index was plotted against several key economic variables. It has been hypothesized that movements in stock price indexes sometimes foretell movements in (Continued on page 6)

Table 1

NEBRASKA STOCK PRICE INDEX
COMPARED WITH THE NATIONAL INDEXES*
(Index Value Followed by Percent Change)

		Nebraska Stock Price Index		Over-the Counter Index		American Stock Exchange Index		Dow Jones Composite		Standard & Poors Composite	
1976	I	100.00	---	90.62	---	103.95	---	304.01	---	102.77	---
	II	103.31	3.31%	90.32	-.33%	105.32	1.32%	310.94	2.28%	104.28	1.47%
	III	100.61	-2.61	91.26	1.04	101.95	-3.20	310.74	-.06	105.24	.92
	IV	105.68	5.04	97.88	7.25	109.84	7.74	325.49	4.75	107.46	2.11
1977	I	115.41	9.21	94.13	-3.83	111.17	1.21	303.24	-6.84	98.42	-8.41
	II	122.23	5.91	99.73	5.95	120.32	8.23	312.31	2.99	100.48	2.09
	III	120.28	-1.60	100.85	1.12	118.88	-1.20	290.61	-6.95	96.53	-3.93
	IV	119.39	-.74	105.05	4.16	127.89	7.60	287.17	-1.18	95.10	-1.48
1978	I	119.17	-.18	106.20	1.09	128.94	.82	266.94	-7.04	89.21	-6.19
	II	135.46	13.67	120.30	13.28	145.55	12.88	282.67	5.89	95.53	7.08
	III	140.75	3.91	132.89	10.47	168.81	15.98	300.45	6.29	102.54	7.34
	IV	134.51	-4.43	117.98	11.22	150.56	-10.81	272.20	-9.40	96.11	-6.27
1979	I	148.01	10.04	131.76	11.68	179.70	19.33	292.37	7.41	101.59	5.70
	II	149.51	1.01	138.13	4.83	200.76	11.72	294.97	.89	102.91	1.30

*Prices of the national indexes are closing prices on the last trading day of each quarter.

Figure 1
THE NEBRASKA STOCK PRICE INDEX AND SELECTED STOCK INDEXES
BY QUARTER, 1976-1979

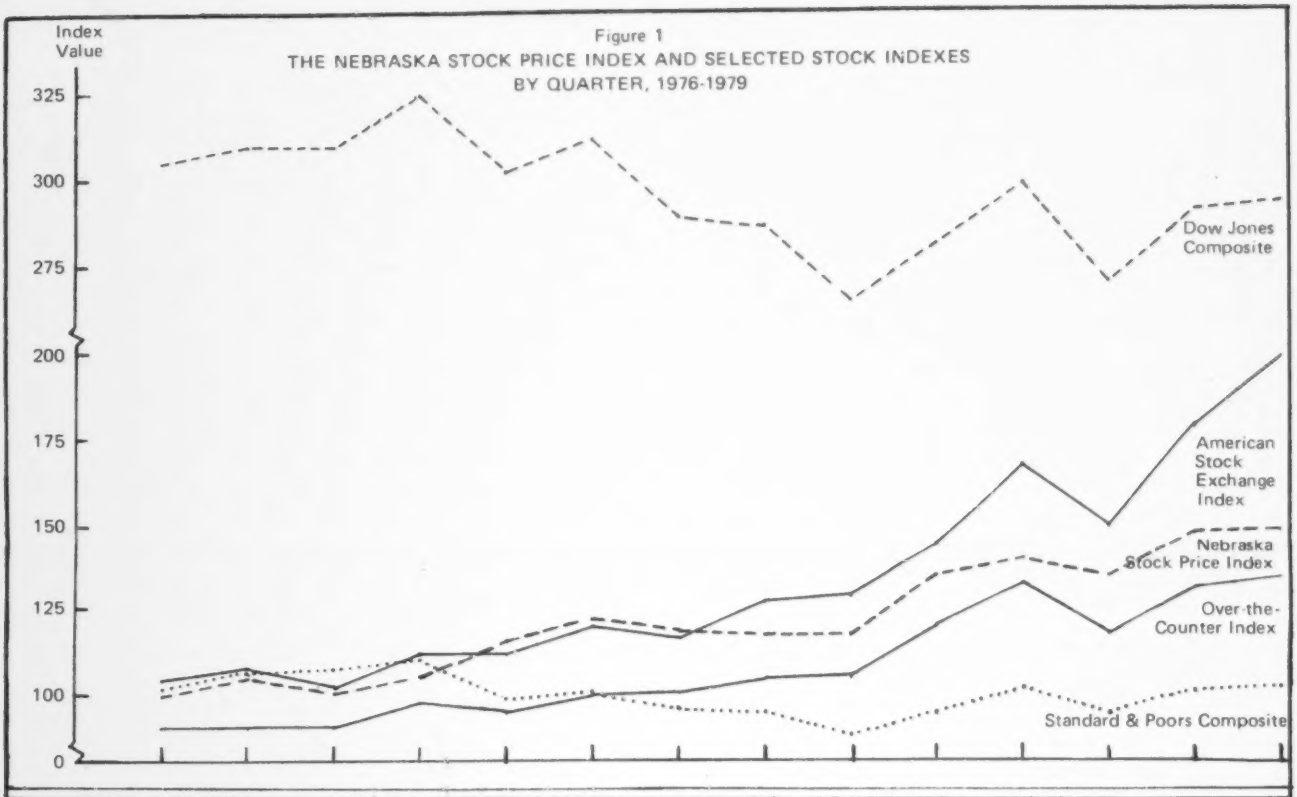
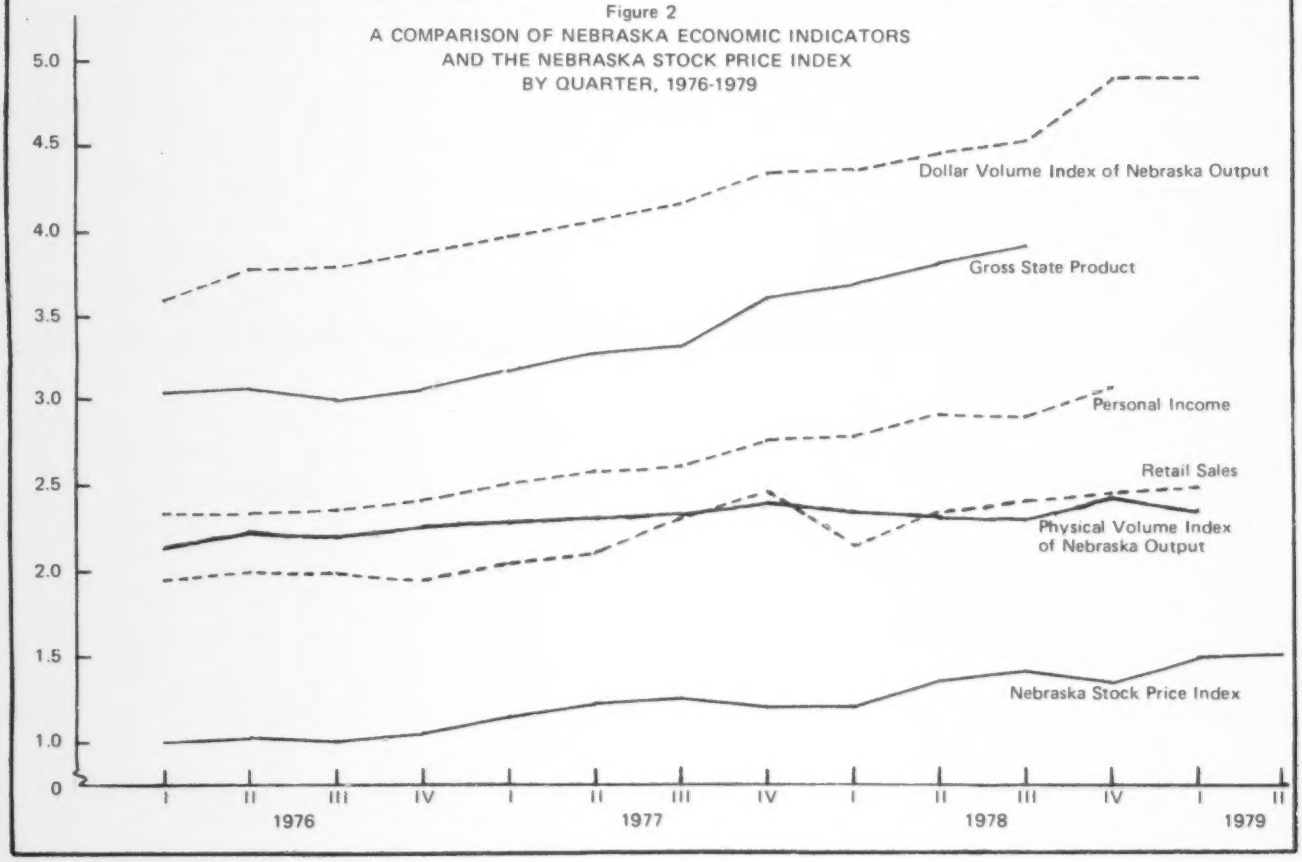


Figure 2
A COMPARISON OF NEBRASKA ECONOMIC INDICATORS
AND THE NEBRASKA STOCK PRICE INDEX
BY QUARTER, 1976-1979



Review and Outlook

Nebraska's real output decreased in June, with the physical volume index for the state recording a loss of 0.5 percent. The May-to-June decrease followed three consecutive monthly increases and resulted in an index value which was 46.2 percent above its 1967 base-period level. Compared to its level of June, 1978, the index experienced a 3.0 percent increase.

This month's decrease in economic activity was concentrated in the nonagricultural sectors, where the index was down 1.1 percent. This marked the first loss in activity since January. Manufacturing, with an increase of 0.4 percent, was the only nonagricultural sector reporting an increase. The decreases in the other nonagricultural sectors were: government, -0.2 percent; distributive, -1.8 percent; and construction, -2.4 percent.

The agricultural sector recorded a May-to-June increase in activity of 3.2 percent. Although this was the fourth consecutive monthly increase for this sector, June's index—as measured by seasonally adjusted cash farm marketings, expressed in real terms—was still below the record level of December, 1978. In June, prices received by Nebraska farmers fell 0.4 percent. Prices have been falling during the last three months, but remain 20.2 percent above those in June, 1978.

June marked the end of the second quarter of 1979, bringing with it the ominous signs of a recession at the national level. The Bureau's physical volume index (Continued on page 5)

Notes for Tables 1 and 2: (1) The "distributive" indicator represents a composite of wholesale and retail trade; transportation, communication and utilities; finance, insurance, and real estate, and selected services. (2) The "physical volume" indicator and its components represent the dollar volume indicator and its components adjusted for price changes using appropriate price indexes—see Table 5, page 5.

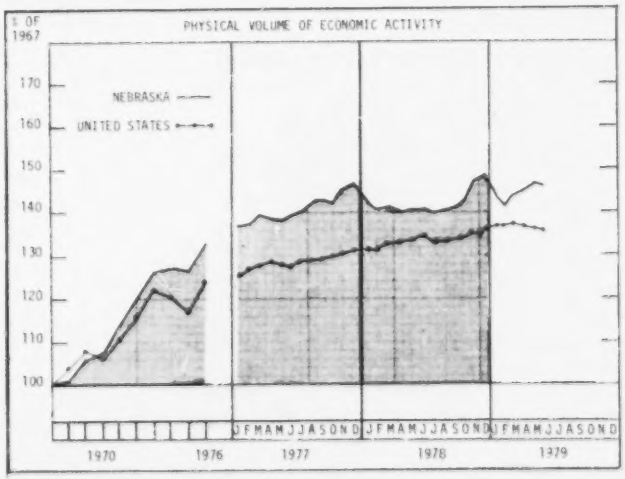
ECONOMIC INDICATORS: NEBRASKA AND UNITED STATES

1. CHANGE FROM PREVIOUS YEAR

June, 1979	Current Month as Percent of Same Month Previous Year		1979 Year to Date as Percent of 1978 Year to Date	
Indicator	Nebraska	U.S.	Nebraska	U.S.
Dollar Volume	115.8	111.8	114.6	113.3
Agricultural	149.7	122.8	127.7	125.8
Nonagricultural	111.2	111.4	112.6	112.9
Construction	98.8	107.4	102.4	113.5
Manufacturing	116.1	115.4	118.2	116.9
Distributive	110.2	110.6	112.1	112.0
Government	113.5	107.4	110.6	107.5
Physical Volume	103.0	101.1	101.9	102.6
Agricultural	124.5	109.4	102.1	105.3
Nonagricultural	100.2	100.8	101.9	102.6
Construction	87.6	95.3	89.8	99.5
Manufacturing	105.1	104.0	106.8	105.9
Distributive	99.4	99.7	101.6	101.6
Government	100.8	100.3	99.7	100.5

2. CHANGE FROM 1967

Indicator	Percent of 1967 Average	
	Nebraska	U.S.
Dollar Volume	327.9	297.7
Agricultural	342.7	322.0
Nonagricultural	325.4	296.9
Construction	331.2	276.1
Manufacturing	367.6	293.4
Distributive	316.8	305.0
Government	299.8	279.2
Physical Volume	146.2	135.8
Agricultural	140.4	135.3
Nonagricultural	147.2	135.9
Construction	125.0	104.2
Manufacturing	161.2	129.8
Distributive	146.2	140.8
Government	139.8	141.6

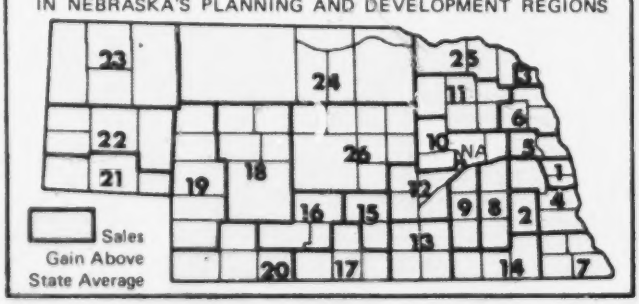


3. NET TAXABLE RETAIL SALES OF NEBRASKA REGIONS AND CITIES (Adjusted for Price Changes)

Region Number[1] and City	City Sales[2]	Sales in Region[2]	
	May, 1979 as percent of May, 1978	May, 1979 as percent of May, 1978	Year to date '79 as percent of Year to date '78
The State	93.4	92.6	101.1
1 Omaha	86.7	85.8	95.6
Bellevue	83.3		
2 Lincoln	94.5	93.3	101.2
3 So. Sioux City	94.7	88.7	95.4
4 Nebraska City	102.2	94.5	104.9
5 Fremont	100.0	96.8	103.8
Blair	94.2		
6 West Point	87.3	101.4	108.8
7 Falls City	94.0	98.5	101.7
8 Seward	104.0	99.8	103.0
9 York	103.4	101.9	110.7
10 Columbus	NA	NA	NA
11 Norfolk	97.0	96.3	105.4
12 Grand Island	94.0	93.8	106.5
13 Hastings	94.7	96.5	102.0
14 Beatrice	94.1	96.6	105.6
Fairbury	101.6		
15 Kearney	104.8	100.4	106.8
16 Lexington	98.7	95.0	108.0
17 Holdrege	80.0	88.9	106.4
18 North Platte	102.4	102.5	108.1
19 Ogallala	105.5	102.8	107.4
20 McCook	108.7	101.6	106.0
21 Sidney	100.2	94.4	103.1
Kimball	87.8		
22 Scottsbluff/Gering	91.6	90.5	104.5
23 Alliance	94.3	97.3	104.7
Chadron	95.4		
24 O'Neill	109.0	108.9	115.2
25 Hartington	91.1	91.6	104.1
26 Broken Bow	114.4	108.5	111.8

[1] See region map below.
[2] Sales on which sales taxes are collected by retailers located in the state. Region totals include motor vehicle sales; city totals exclude motor vehicle sales.
Compiled from data provided by Nebraska Department of Revenue.

1979 YEAR TO DATE AS PERCENT OF 1978 YEAR TO DATE IN NEBRASKA'S PLANNING AND DEVELOPMENT REGIONS



(Continued from page 4) for the United States fell 0.4 percent during the second quarter when compared to the first quarter, and was only 1.6 percent above the second quarter of last year. The primary reason for this slump was the softness in the distributive sector, where second-quarter output was down 1.5 percent. It appears that consumer expenditures and confidence are worsening at the national level, with little if any improvement expected in the near future.

In sharp contrast to the national picture, the physical volume index for Nebraska showed considerable strength during the second quarter, 1979. The index rose 2.2 percent during this quarter when compared to the first quarter, and was 3.0 percent above the second quarter of last year. Although all sectors reported increases, the second-quarter growth was due primarily to a 10.0 percent increase in agricultural activity. Given the prospect of an excellent harvest, the outlook for the Nebraska economy is considerably more favorable than for the nation as a whole.

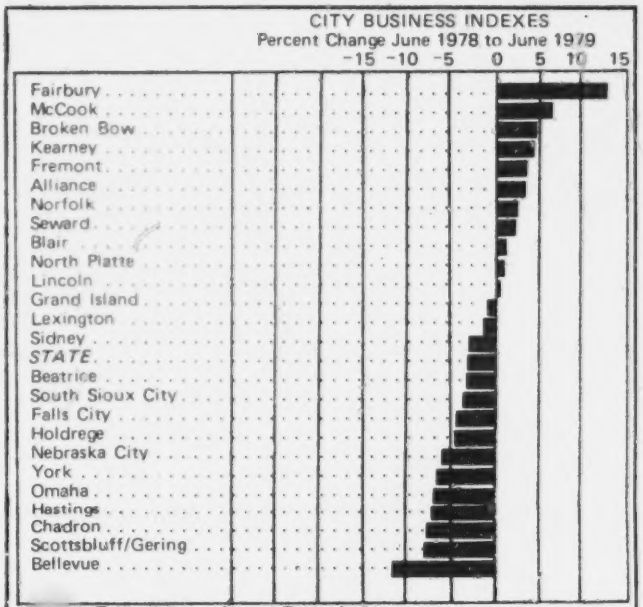
The construction sector reversed the trend of earlier quarters, as seasonally adjusted second-quarter activity was up 2.8 percent over the previous quarter. However, this increase was too little to compensate for previous losses. The index for March was 12.4 percent below the level of last June, with only twelve of the state's principal cities reporting increases over last year.

Growth in the manufacturing sector continued in the second quarter, as output was 0.8 percent higher than the first quarter and was accompanied by a 1.1 percent increase in employment. Compared to last June, this month's index showed a 5.1 percent increase. Based upon employment growth, durable goods manufacturing improved the most over last year.

The physical volume index for the distributive sector rose 1.2 percent this quarter, with a slightly higher percent growth in employment. Compared to June, 1978, real output was down 0.6 percent, marking the first year-to-year drop in this sector since December, 1978. After adjustment for price changes, only eight of the twenty-five available planning regions reported retail sales above those of last June.

The index for the government sector rose 0.3 percent during the second quarter, with most of the growth occurring in May. Additionally, government activity was up 0.8 percent compared to June, 1978.

In June, eleven of the twenty-five reporting cities experienced increases in business activity relative to June, 1978. Fairbury recorded the largest gain (+12.9 percent). Other cities with June-to-June increases of 3.0 percent or more were McCook, Broken Bow, Kearney, Fremont, and Alliance. J. A. D.



Source: Table 3 (page 4) and Table 4 below.

4. JUNE CITY BUSINESS INDICATORS

The State and Its Trading Centers	Percent of Same Month a Year Ago: Employment[1]	Building Activity[2]	Power Consumption[3]
The State	99.5	93.3	100.7
Alliance	124.9	21.6	121.9
Beatrice	99.9	78.8	101.1
Bellevue	96.2	43.3	101.1
Blair	97.4	105.3	143.4
Broken Bow	99.4	113.2	88.2
Chadron	94.2	87.4	70.1
Columbus	99.5	165.0	102.3
Fairbury	101.1	1144.4	112.8
Falls City	95.4	88.9	102.7
Fremont	103.6	102.1	117.8*
Grand Island	103.4	86.3	106.1
Hastings	100.8	45.1	83.7
Holdrege	100.1	301.9	85.5
Kearney	106.5	95.8	101.9
Lexington	97.0	104.6	99.9
Lincoln	102.4	133.3	102.0
McCook	96.2	176.9	122.8
Nebraska City	95.8	34.8	94.9
Norfolk	96.3	245.4	111.6
North Platte	96.8	113.2	108.3
Omaha	96.2	99.9	100.0
Scottsbluff /Gering	96.2	84.5	77.8
Seward	98.6	100.1	112.2
Sidney	94.8	65.7	108.7
So. Sioux City	93.3	97.9	110.5
York	95.2	24.3	101.8

[1] As a proxy for city employment, total employment for the county in which a city is located is used.
[2] Building Activity is the value of building permits issued as spread over an appropriate time period of construction. The U.S. Department of Commerce Composite Construction Cost Index is used to adjust construction activity for price changes.
[3] Power Consumption is a combined index of consumption of electricity and natural gas except in cases marked * for which only one is used.

Source: Compilation by Bureau of Business Research from reports of private and public agencies.

5. PRICE INDEXES

June, 1979	Index (1967 = 100)	Percent of Same Month Last Year	Year to Date as Percent of Same Period Last Year*
Consumer Prices	216.6	110.9	110.3
Commodity component	208.4	111.1	110.4
Wholesale Prices	233.1	111.2	111.0
Agricultural Prices			
United States	238.0	112.3	119.3
Nebraska	244.0	120.2	124.7

*Using arithmetic average of monthly indexes.
Sources: Consumer and Wholesale Prices: U.S. Bureau of Labor Statistics; Agricultural Prices: U.S. Department of Agriculture.

(Continued from page 3) economic activity. Investors in their individual decisions are alleged to move stock prices downward in advance of peaks in the economy and upward in advance of bottoms in the level of economic activity.

The most common measures of economic activity at the state level include the dollar volume Nebraska output, gross state product, Nebraska personal income, the physical volume of output, an index maintained by the Bureau of Business Research, and net taxable retail sales. These indicators provide an approximation of the level of economic activity. The indicators were available through 1978 and are plotted in Figure 2 (page 3). There is a sufficient number of observations to determine if trends exist. The indicators were converted into an index number for facilitating comparisons.

The trend of all the economic indicators in Figure 2 is up. The Nebraska Stock Price Index more or less goes along with this upward trend. The index peaked in the third quarter of 1977 prior to a peak in the state's physical volume output index, but other than that relationship, there would appear to be little pattern between the NSPI and other economic variables. The NSPI has leveled off in 1979, which may indicate a plateau in the Nebraska economy in the latter half of 1979 and 1980. A recession is under way nationally, and the leveling off in the NSPI may signal a leveling in the Nebraska economy. Considering the observations available through 1978, it would appear that the Nebraska Stock Price Index is not a reliable or accurate measure of changes in the level of economic activity. The measures move more or less simultaneously.

While stock price changes usually develop prior to major moves in the national level of economic activity, not all swings in stock prices are followed by a similar movement in the level of economic activity. For instance, the Dow Jones Industrial average declined from a September, 1976, high of 1014 to a February, 1978, low of 742 while the economy was generally expanding. It could be held that this decline was in anticipation of the 1979 recession, although it seems that such an interpretation would be stretching the credibility of the efficient market information theory. (For information on the Dow Jones average over an extended period of time, see Media General, *The Financial Weekly Market Digest*, September 10, 1979.) State stock price indexes may produce similar misleading signals.

CONCLUSIONS

The purpose in constructing a Nebraska stock price index was to ascertain whether it would be useful in predicting economic activity at the state level. An increasing amount of resources has been devoted to forecasting economic activity at the state level, and since some investigators contend that there is a relationship between stock prices and the level of economic activity at the national level, a search was made for a similar relationship at the state level.

The results presented here indicate that a stock index consisting of Nebraska stocks is not an adequate predictor of economic activity in the state. Admittedly, the tests are weak and require more statistical vigor, which can only come with additional data observations. While the number of observations is extremely limited, economic activity and stock prices have gone up during the period under review. With few major swings in economic activity over the observation interval, the period hardly constitutes a sufficient test of the index's predictive ability.

There is some reason to suspect that while there may be a relationship between stock prices and the level of economic activity at the national level, such a relationship may not hold in a state such as Nebraska. The national economy is passing through a recession which Nebraska may avoid if the recession remains mild by historic standards. Some of the stocks in the Nebraska Stock Price Index are probably influenced as much by national variables as they are by factors in Nebraska, and consequently their price may reflect national conditions more than conditions in Nebraska. It should also be noted that the sample size of the NSPI is limited and may not be representative of the Nebraska economy.

Before the NSPI is declared to be a useful economic indicator or put on the shelf as unreliable and inaccurate, more observations will have to be made. Additional Nebraska firms should be added to broaden the base of the index. With these improvements, the Nebraska Stock Price Index may find a place among the state's economic indicator series.

JONI K. PIERCE*

*Assistant Securities Analyst for Bankers Life of Nebraska.

UNL News

BUSINESS IN NEBRASKA
PREPARED BY BUREAU OF BUSINESS RESEARCH
Member, Association for University Business & Economic Research

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No. 421 October, 1979

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